CLAIMS

1. A method of managing connectivity between an end-device and one of a plurality of bridging-devices connected to the end-device, comprising:

transmitting test messages by each of the bridging-devices;

transmitting test messages by the end-device;

determining, in each of the bridging-devices, with which of the other devices there is an operative connection, based on the test messages the bridging-device receives; and

determining, in each of the bridging-devices, whether a port leading to the end-device should be in a forwarding or blocking state responsive to the determination of the operative connections.

2. A method according to claim 1, wherein the bridging-devices and end-device are connected through a common Ethernet repeater.

3. A method according to claim 2, wherein at least one additional end-device is connected to the bridging-devices through the common Ethernet repeater.

4. A method according to claim 3, wherein the at least one additional end-device transmits test messages.

5. A method according to claim 3, wherein the at least one additional end-device does not transmit test messages.

6. A method according to claim 1, wherein the end-device is connected to the bridging-devices through a single port of the end-device.

7. A method according to claim 1, wherein transmitting the test messages by the end-device comprises transmitting said messages in response to response requests from at least one of the bridging-devices.

8. A method according to claim 7, wherein transmitting the test messages by the end-device comprises transmitting address resolution protocol (ARP) messages.

9. A method according to claim 8, wherein transmitting the ARP messages by the end-device comprises transmitting in response to unicast ARP requests.

10. A method according to claim 7, wherein transmitting the test messages by the end-device comprises transmitting ICMP echo messages.

11. A method according to claim 1, wherein transmitting the test messages by the bridging-devices comprises transmitting messages with Bridge Protocol data Units (BPDU) destination addresses.

12. A method according to claim 1, wherein transmitting the test messages by the end-device comprises transmitting messages with Bridge Protocol data Units (BPDU) destination addresses.

13. A method according to claim 1, wherein transmitting the test messages by the bridging-devices comprises transmitting ARP messages or ICMP messages.

14. A method according to claim 1, wherein transmitting the test messages by the bridging-devices comprises transmitting messages which include acknowledgments of test messages recently received from other bridging-devices.

15. A method according to claim 1, wherein transmitting the test messages by the bridging-devices comprises transmitting messages which include an indication of the protocol state of the port toward the end-device of the transmitting bridging-device.

16. A method according to claim 15, wherein transmitting messages which include an indication of the protocol state of the port comprises transmitting messages which include indication on whether the port is blocking, "moving to forward" or forwarding.

17. A method according to claim 1, wherein determining with which of the other devices there is an operative connection, based on the test messages the bridging-device receives comprises making said determination based on whether the messages are received.

18. A method according to claim 1, wherein determining with which of the other devices there is an operative connection, based on the test messages the bridging-device receives comprises making said determination based on the contents of the received messages.

19. A method according to claim 1, wherein determining by a bridging-device with which of the other devices there is an operative connection comprises considering a device as having an operative connection with the determining bridging-device if at least a predetermined percentage of the test messages expected to have been transmitted by the other device, are received over a predetermined period by the determining bridging-device.

20. A method according to claim 19, wherein determining by a bridging-device with which of the other devices there is an operative connection comprises considering a device as having an operative connection with the determining bridging-device if at least one of the test messages expected to have been transmitted by the other device, are received over a predetermined period by the determining bridging-device.

21. A method according to claim 1, wherein determining with which of the devices there is an operative connection comprises considering a device as having an operative connection only if at least one of the test messages received from the other device over a predetermined period include acknowledgments of receiving test messages from the determining bridging-device.

22. A method according to claim 1, wherein determining whether the port should be in forwarding or blocking state comprises choosing the forwarding state if the connection with the end-device is operative and the connection to the other bridging-devices is inoperative or if the other bridging-devices did not choose the forwarding state.

23. A method according to claim 1, wherein the bridging-devices are organized in a predetermined order and wherein determining whether the port should be in the forwarding or the blocking state comprises choosing the forwarding state if the connection with all the bridging-devices higher in the predetermined order are considered inoperative.

24. A method according to claim 1, wherein determining whether the port should be in forwarding or blocking state comprises choosing the forwarding state only if no other bridging-device with operative connection to the end-device is in the forwarding state.

25. A method according to claim 1, comprising moving a port which should be in the blocking state according to the determination, to an emulated blocking state in which at least some test messages carrying destination addresses other than the standard STA BPDU address may be transmitted and received through the port but substantially all messages received through the port are not forwarded through any other port of the bridging-device containing the emulated blocking port.

26. A method according to claim 25, wherein moving the port to the emulated blocking state comprises moving the port to a state in which at least some test messages carrying destination addresses other than the standard STA BPDU address may be transmitted and received through the port to and from the processor of the bridging-device.

27. A method according to claim 25, wherein moving the port to the emulated blocking state comprises moving the port to a state in which substantially all messages received through other ports of the bridging-device are not forwarded through the emulated blocking state.

28. A method according to claim 25, wherein moving the port to the emulated blocking state comprises moving the port to a state in which at least some of the messages received through the emulated blocking port are not passed to the processor.

29. A method according to claim 28, wherein moving to a state in which at least some of the messages received through the emulated blocking port are not passed to the processor comprises moving the port to a state in which broadcast and multicast messages received through the port are not passed to the processor.

30. A method according to claim 25, wherein moving the port to the emulated blocking state comprises moving the port to a state in which messages received through the emulated blocking port are not used in matching addresses to ports.

31. A method according to claim 25, wherein moving the port to the emulated blocking state comprises tagging all untagged messages received by the port as belonging to a VLAN to which none of the other ports of the bridging-device belong.

32. A method according to claim 25, wherein moving the port to the emulated blocking state comprises moving the port to a state in which the emulated blocking port transmits and receives only messages of a specific VLAN which is not supported by any of the other ports of the bridging-device.

33. A method of preventing formation of loops in a network comprising a plurality of devices, each having one or more ports, connected by communication links, comprising:

transmitting test messages by the plurality of devices;

determining in fewer than all the transmitting devices, which of the ports of the determining device should be in the forwarding state, based on the test messages the determining device receives; and

setting all the ports of the non-determining transmitting devices, permanently to the forwarding state.

34. A method according to claim 33, wherein the non-determining transmitting devices comprise only a single port each.

35. A method according to claim 33, wherein the non-determining transmitting devices comprise end-stations.

36. A method according to claim 33, wherein the non-determining transmitting devices do not run a software related to the loop prevention method.

37. A method according to claim 33, wherein transmitting test messages by the non-determining devices comprises transmitting response requests to the non-determining devices from one or more of the determining devices and transmitting said test messages in response to the response requests by the non-determining devices.

38. A method according to claim 37, wherein transmitting response requests comprises transmitting ARP requests.

39. A method according to claim 38, wherein transmitting ARP requests comprises transmitting ARP requests with unicast destination addresses.

40. A method according to claim 37, wherein transmitting response requests comprises transmitting ICMP echo messages.

41. A method according to claim 37, wherein transmitting response requests comprises transmitting response requests with one or more special source addresses which do not belong to any of the devices.

42. A method according to claim 37, comprising configuring the device transmitting the response requests with a IP address of the non-determining device to which the response requests are transmitted.

43. A method according to claim 37, comprising configuring the device transmitting the response requests with a MAC address of the non-determining device to which the response requests are transmitted.

44. A method according to claim 37, comprising determining, by the device transmitting the response requests, of the IP address of the non-determining device to which the response requests are transmitted, from messages unrelated to the loop prevention method transmitted from the non-determining device.

45. A method according to claim 33, wherein the determining transmitting devices comprise bridging-devices.

46. A method according to claim 33, comprising moving at least one of the ports to an emulated blocking state in which test messages may be transmitted and received through the port but all messages received through the port are not forwarded through any other port of the device which comprises the emulated blocking port.

47. A method according to claim 46, wherein moving the at least one of the ports to the emulated blocking state comprises tagging all messages received by the port as belonging to a VLAN to which none of the other ports of the device belong.

48. A method according to claim 46, wherein moving the at least one of the ports to the emulated blocking state comprises moving to a state in which the emulated blocking ports transmit and receive only messages of a specific VLAN not in common with any of the other ports of the device to which the emulated blocking port belongs.

49. A method according to claim 46, wherein moving the at least one of the ports to an emulated blocking state comprises moving ports which lead to non-determining devices.

50. A device of a local area network, comprising:

at least one port through which the device sends test messages, used in determining the topology of the network, to one or more bridging-devices of the network; and

a processor which runs an IP stack but does not run a software of any port blocking method.

51. A method of blocking ports to prevent formation of active loops in a network, comprising:

determining topology information of the network;

determining whether one or more specific ports of the network are currently active; and

determining which port should be active, based on the determined topology information and based on whether the one or more specific ports of the network are currently active.

52. A method according to claim 51, wherein determining the topology information comprises transmitting test messages between devices of the network.

53. A method according to claim 52, wherein determining the topology information comprises determining whether the transmitted test messages are received.

54. A method according to claim 52, wherein transmitting the test messages comprises transmitting messages which include indication of the protocol state of one or more of the ports of the transmitting device.

55. A method according to claim 51, wherein determining the topology information comprises determining whether the links to which the one or more ports lead, are operative.

56. A method according to claim 55, wherein determining the topology information comprises receiving hardware indications on the operability the links to which the one or more ports lead.

57. A method according to claim 51, wherein determining which port should be active comprises determining that a first port should be active only if all the other ports leading to the same device as the first port are not currently active.

58. A method according to claim 57, wherein all the ports leading to the same device as the first port are ordered in a predetermined order and wherein determining which port should be active comprises determining that the first port should be active only if all the other ports higher than the first port in the predetermined order are not in a state indicating that the port is planning to be active.

59. A method according to claim 51, wherein determining whether the one or more specific ports of the network are currently active comprises determining by a first device of the network whether at least one port of a second device of the network is active.

60. A method of blocking ports to prevent formation of active loops in a network, comprising:

determining topology information of the network;

determining one or more parameters of the network;

blocking a first group of ports responsive to the determined one or more parameters of the network and responsive to the determined topology information;

changing at least one of the one or more parameters of the network responsive to the blocking of the first group of ports; and

determining whether to change the group of blocked ports responsive to the changed at least one of the one or more parameters.

61. A method according to claim 60, wherein determining the topology information comprises determining whether one or more links of the network are operative.

62. A method according to claim 60, wherein determining the one or more parameters of the network comprises determining weights of one or more links of the network.

63. A method according to claim 62, wherein changing at least one of the one or more parameters of the network comprises changing the weight of at least one of the links of the network.

64. A method according to claim 63, wherein changing the weight of the at least one of the links comprises reducing the weight of at least one currently active link of the network.

65. A method according to claim 60, wherein determining the one or more parameters of the network comprises determining an activating priority order of a plurality of ports of the network.

66. A method according to claim 65, wherein changing at least one of the one or more parameters of the network comprises changing the position of at least one of the plurality of ports in the activating priority order.

67. A method according to claim 66, wherein changing the position of at least one of the plurality of ports in the activating priority order comprises moving a currently active port to the top of the priority order.

68. A method according to claim 60, wherein determining the one or more parameters comprises transmitting test messages between devices of the network.

69. A method according to claim 68, wherein transmitting the test messages comprises transmitting BPDUs.

70. A method according to claim 60, wherein changing at least one of the one or more parameters of the network comprises reducing the number of possible operability changes which will change the group of blocked ports of the network by changing the at least one of the one or more parameters of the network.

71. A method according to claim 60, wherein changing at least one of the one or more parameters of the network comprises preventing the group of blocked ports of the network from changing without a failure occurring on the connection of an active port by changing the at least one of the parameters.

72. A method of blocking ports to prevent formation of active loops in a network, comprising:

blocking a first group of ports at a first time responsive to an operativeness state of the network; and

blocking a second group of ports different from the first group of ports, at a second time, while the network is in the same operativeness state as caused the blocking of the first group of ports.

73. A method according to claim 72, wherein the operativeness state of the network comprises a state in which substantially all the elements of the network are operative.

74. A method according to claim 72, comprising blocking the second group of ports responsive to a different operativeness state of the network than caused the blocking of the first group of ports and wherein blocking the second group of ports while the network is in the same operativeness state as caused the blocking of the first group of ports comprises not changing the group of blocked ports although the operativeness state of the network changed from the different operativeness state to the same operativeness state as caused the blocking of the first group of ports.

75. A method according to claim 72, comprising transmitting, from a plurality of bridging-devices of the network, test messages which include indication of the current state of the ports of the transmitting bridging-device and wherein blocking the second group of ports comprises

blocking the second group of ports rather than the first group of ports responsive to the transmitted test messages.

76. A method according to claim 72, wherein the network includes a plurality of bridging-devices and wherein at least some of the plurality of bridging-devices change the state of a port from forwarding to blocking only if the port is inoperative or suspected as being inoperative.

77. A method of blocking ports to prevent formation of active loops in a network, comprising:

transmitting messages by at least one first bridging-device to at least one second bridging-device of the network;

transmitting messages by the at least one second bridging-device to the at least one first bridging-device responsive to the messages from the at least one first bridging-device to the at least one second bridging-device; and

determining which ports to block responsive to at least the messages transmitted by the at least one second-bridging device received by the at least one first bridging-device.

78. A method according to claim 77, wherein transmitting messages by the at least one second bridging-device to the at least one first bridging-device comprises transmitting messages which include acknowledgments of the messages from the at least one first bridging-device to the at least one second bridging-device.

79. A method according to claim 77, wherein transmitting messages from the at least one second bridging-device to the at least one first bridging-device comprises transmitting spanning tree algorithm BPDUs.

80. A method according to claim 79, wherein transmitting messages from the at least one first bridging-device to the at least one second bridging-device comprises transmitting messages between substantially each pair of directly linked bridging-devices in the network.

81. A method according to claim 77, wherein determining which ports to block comprises determining which ports to block, responsive to whether the messages transmitted by the at least one second-bridging device are received.

82. A method according to claim 81, wherein determining which ports to block comprises determining which ports to block, responsive to the contents of the messages received by the at least one first bridging-device.

83. A device of a local area network, comprises:

a processor; and

at least one port which passes to the processor at least messages belonging to a plurality of different protocols and which does not forward any of the messages it receives through any other port of the device.

84. A device according to claim 83, wherein the at least one port determines which messages are passed to the processor based on the destination address of the packets and wherein the at least one port passes to the processor messages of a plurality of different destination addresses.

85. A device according to claim 84, wherein the at least one port passes to the processor messages of at least one address different from the standard STA BPDU address.

86. A method according to claim 83, wherein the at least one port does not forward messages received through any of the other ports of the device.

87. A device according to claim 83, wherein the at least one port does not match addresses to ports.

88. A device according to claim 83, wherein the at least one port tags all untagged messages received by the at least one port as belonging to a VLAN to which none of the other ports of the device belong.